

DIFFERENTIAL DIFFERENCE AMPLIFIER FOR AMPLIFYING
SMALL SIGNALS CLOSE TO ZERO VOLTS

ABSTRACT OF THE DISCLOSURE

There is disclosed a differential difference amplifier for
5 amplifying an input signal close to a negative supply voltage
and adding an offset voltage to the amplified input signal. The
differential difference amplifier comprises: 1) a first non-
inverting input terminal coupled to the input signal; 2) a first
inverting input terminal coupled to the negative supply voltage;
10 3) a second inverting input terminal coupled to a feedback
resistor coupled to an output of the differential difference
amplifier; and 4) a second non-inverting input terminal coupled
to the offset voltage. The differential difference amplifier
also comprises: 5) a first differential transistor pair
15 comprising a first transistor having a gate coupled to the first
non-inverting input and a second transistor having a gate
coupled to the first inverting input; 6) a second differential
transistor pair comprising a third transistor having a gate
coupled to the second non-inverting input and fourth transistor
20 having a gate coupled to the second inverting input; 7) a first
cascode transistor pair comprising a fifth transistor having a

gate coupled to the first non-inverting input and a source coupled to a drain of the first transistor and a sixth transistor having a gate coupled to the first inverting input and a source coupled to a drain of the second transistor; and

5 8) a second cascode transistor pair comprising a seventh transistor having a gate coupled to the second non-inverting input and a source coupled to a drain of the third transistor and an eighth transistor having a gate coupled to the second inverting input and a source coupled to a drain of the fourth

10 transistor.